# THICOS 2023 THIND X TANKS







ยินดีต่อนรับ





# Roots of a Better Future: Grape King Bio

Presenter: Chin-Chu Chen, PhD

General Manager

Date: 2023/09/12

### Grape King Bio's Milestones

**Grape King Bio** 

Health and Vitality
Power Visitor
Centre

Grape King
Biotech Research
Institute

GK Bio International Malaysia







GKB

1969

1997

1998

2016

2017

2018

2019

2023



Shanghai Grape King



Grape King Bio

Pingzhen Headquarters

Taipei Grape King & Pro-Partner

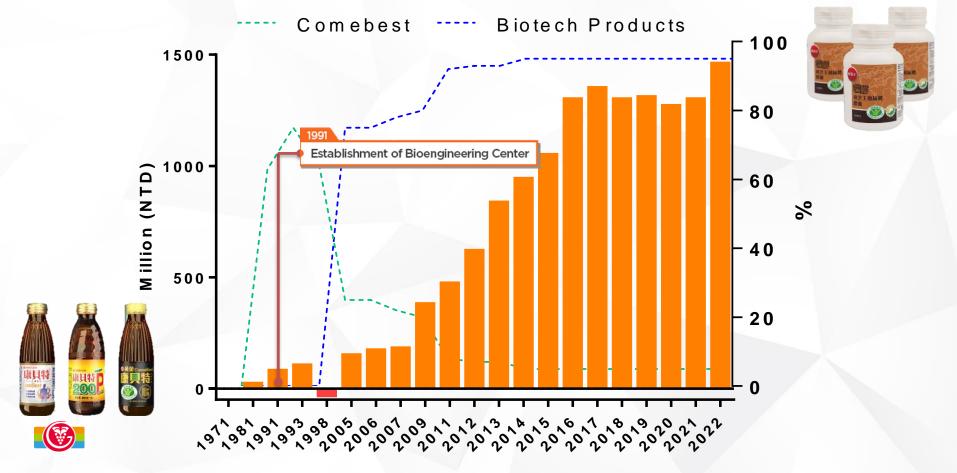
Headquarters



Grape King Bio
YongFeng Factory



### **Total Grape King Revenue since 1971**

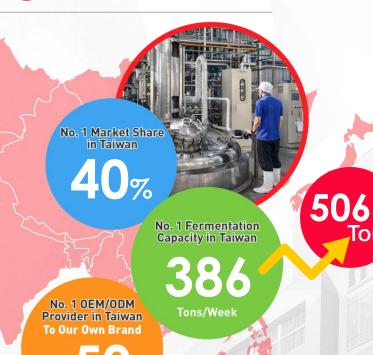


### Largest Functional Raw Material Provider in Taiwan

Grape King Biotech Research Institute has over 30 years of experience in mushrooms and probiotics, occupying a leading position in the Taiwan industry 120 tons of fermentation tanks under

construction within YongFeng Factory

With rich experience in OEM/ODM services, mainly for China, Europe, US and Southeast Asia countries.







### Professional R&D Team; Leading R&D Technology; Knowledge about Market Trends

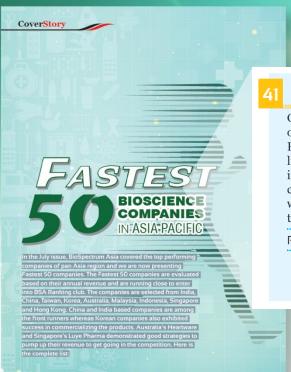




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BioSpectrum / Vol 11 / Issue 8 / August 2016



2016.08

### 41 GRAPE KING

Grape King is one of the top manufacturers in the health food biotechnology industry of Taiwan and is also a cGMP (Current Good Manufacturing Practices) certified pharmaceutical manufacturer. The company was established in 1991 for research and development as well as production of drugs including Antrodia camphorata, Antrodia salmonea and antibiotics. The company has been awarded one US patent, two China patents and six Taiwan patents via working with national academic and research institutions to develop and improve products through cooperative research.

Revenue: \$232 million





### One of the Best Probiotic Experts in the World

October, 2018
Up to Date

Our Probiotic Products'
Market Share

No. 7 in the World

生技醫藥 產業透析 NO.116 Euromonitor; DCB 產業資訊組整理 (2018.10)





科學提明,以及特置增加生活利益等核通過之環境食品部類,與起一、企業、 解码正、結價、生間、保持、合理、集份、抵和、銀度、實質、及網、多 所經歷學也可,其並是而需要於因及特別與對於國內之程度是認識。所 這、我也、是他、明如此、生態、配職、多得賦益、則可及企益等公司的更 是可以再轉詞問則監查教育功能之價度合品認益。 查灣機衡對棒點展集為外市場,並在全球益生簡顯金續充品

女 碎之丛			
Ranking	Company Name	Market Share	Representative Brand
1	P&G	3.8	Align
2	Sanofi	3.5	Enterogermina
3	大正製藥	3.0	表飛鳴
4	i-Health	2.6	Culturelle
5	Clorox	1.9	Renew Life

7 Grape King Bio 1.5 Probiotics & Prebiotics, Super 13 Pro&Prebiotics

資料反應;Forescentor;DCB 多等質訊記管理(2618.10)

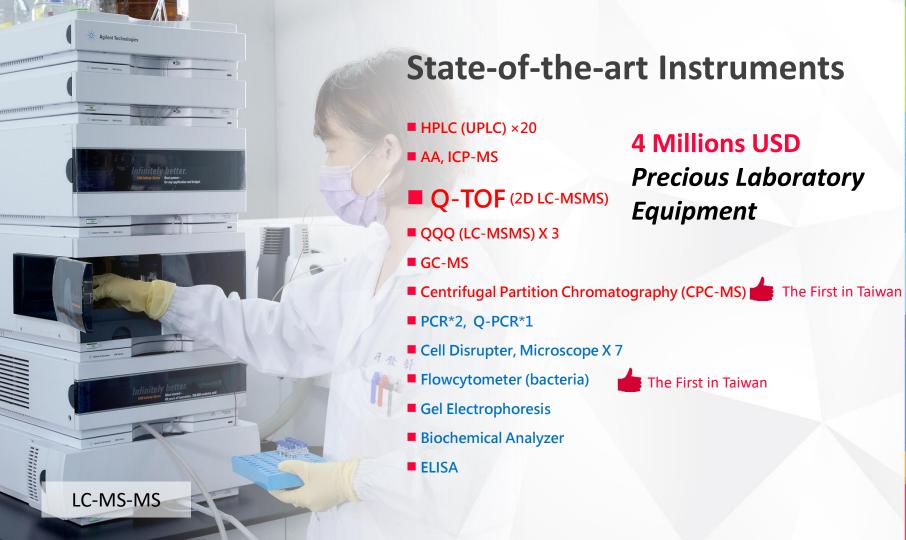
4 | 2028 #- 3

著作權為本數級單位 (DCB) 所有,牛拌翻即、轉載或以任何方式重載內容









### Quality

### We Set the Bar for **Food Safety**

Our quality control and quality assurance procedures exceed global standards.

Invested USD 2 million to build an internationally certified food safety inspection center to provide related inspection services

Obtained both international food certification and pharmaceutical GMP, the only company in Taiwan to do so.

### Laboratory







3129

Testing Laboratory 3388

### Health **Ingredient**





### **Environmental** Safety











#### **Manufacturing Process**























### Dosage and Packaging Selections

Glass bottles

10 mL-180 mL

398,400 bottles/day

Combibloc

180 mL-200 mL

96,000 packs/day Retort Pouch

20 mL-30 mL

720,000 bags/day Sachets /Bags

**1.5 g-3 g** 5 g-18 g

720.000 576,000 bags/day Capsules

400 mg-650 mg

4,200,000 caps/day Jelly

15 g

Soft Gels

Oval size 300mg 500mg















### **Government Approval Health Food Certificates**

































Taiwan FDA-Certified Products

+ 3

China-FDA-Certified
Products

-

Thailand-FDA-Certified
Product





66

# **Exclusive Techniques**

**National Industrial Innovation Awards** 



Cordyceps Cicadae 2017

Hericium Erinaceus / Lion's Mane 2015

Probiotics 2014

Antrodía Cínnamomea 2<mark>01</mark>2



### Won the Taiwan BIO Innovative Awards- Since 2019



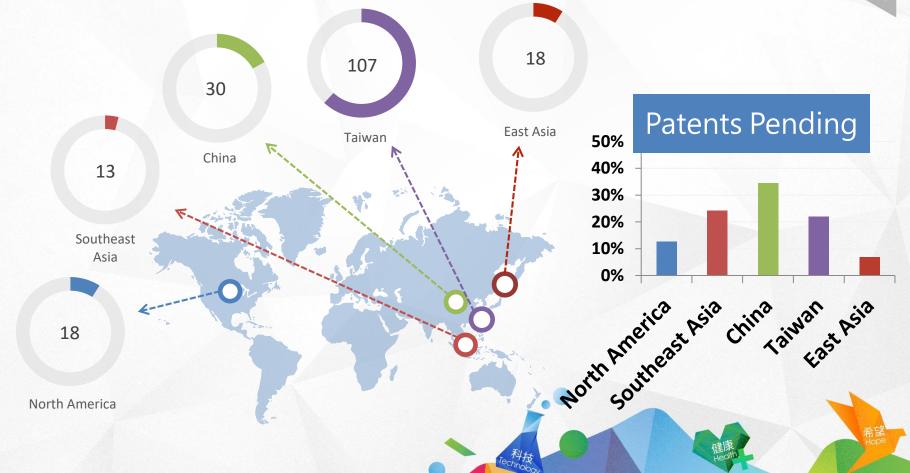






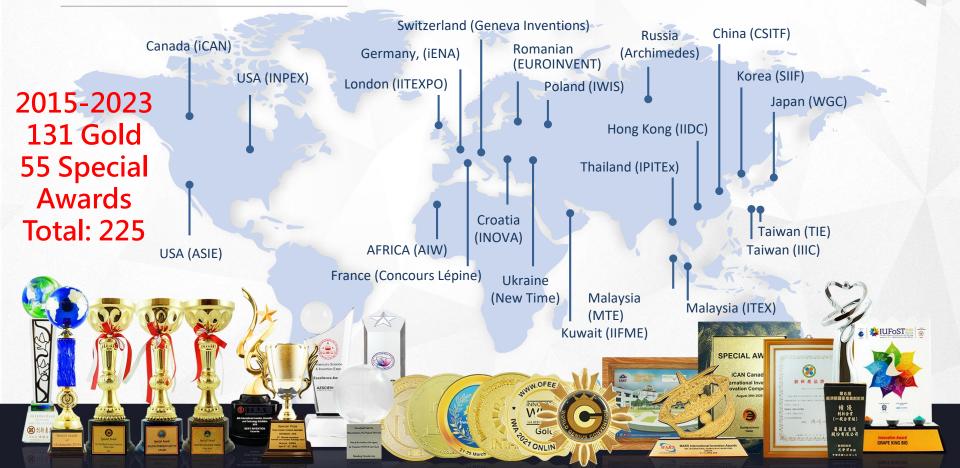


### **Patents Granted: 186 worldwide**





### **Achieve International Recognition-20 Countries**







# **GK Biotech Exclusive Ingredients**

### **Exclusive Biotech Ingredients**

**Natural Source** 



**Bioactive Ingredients** 



**Specific Application** 

*Lignosus rhinocerus* 

Coriolus versicolor

Grifola frondosa

Armillaria mellea

Bifidobacterium

Clostridium butyriçum

Antrodia cinnamomea

Ganoderma lucidum

Hericium erinaceus

Cordyceps spp.

Sanghuangporus sanghuang

Lactobacillus









# **Traditional Culturing**









200 pieces / hour

1600 pieces = 80 kg

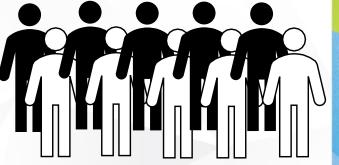






### Traditional Culturing





10 workers

16000 pieces = 800 kg (month)







### **Core Technology- Mass and Precision Fermentation**



Source Quality Control

Tightly-controlled Environments

Concentrated Essence



40 Tons





Fermentation
Scale Up



Induce Target Molecules



Optimized Strain

Development

**Optimized Bioprocessing** 

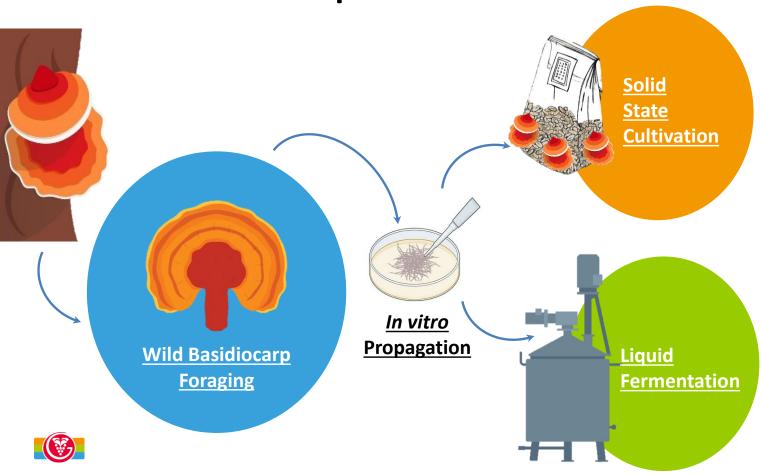
(1-14 days)

Desired High-Value Functional Ingredients





**Carbon Emission: Liquid vs Solid-State** 



Produce 1 kg Mushroom: 8.0 kW 4.41 kg CO<sub>2</sub>

9 L H<sub>2</sub>O

Source: Int J LCA 2019. 24:456–467

Produce 1 kg Mycelia:

2.1 kW 1.07 kg CO<sub>2</sub> 1 L H<sub>2</sub>O

Source: Grape King Bio



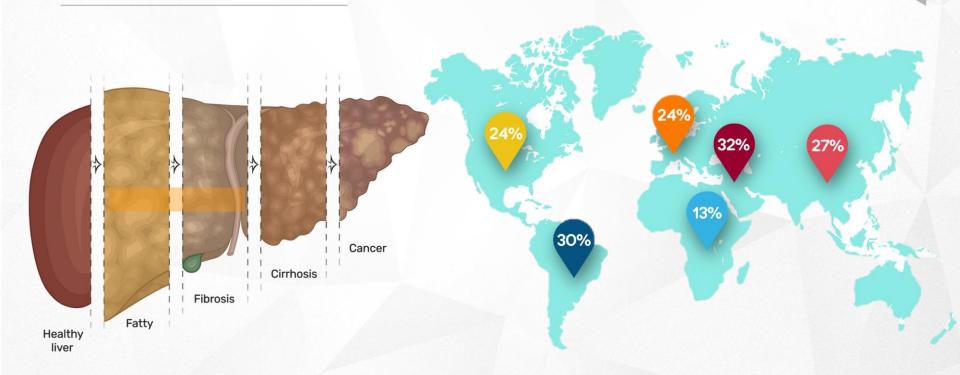
Eye care **GK-Cordyceps**©

Brain care **GK-Hericium**©





### Nonalcoholic Steatohepatitis



Source: www.international-NASH-Day.com





### **GK-Antrodia** © in Nonalcoholic Steatohepatitis

JOURNAL OF THE AMERICAN COLLEGE OF NUTRITION https://doi.org/10.1080/07315724.2020.1779850

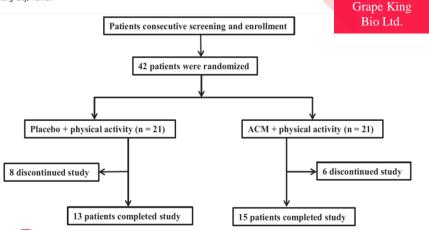


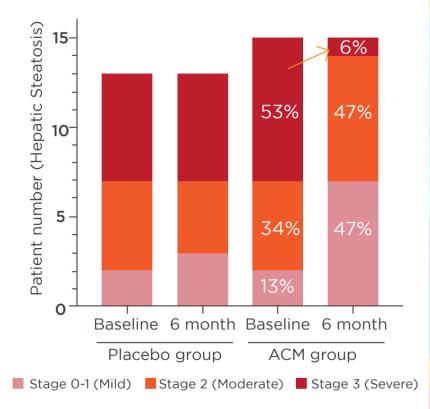


# Hepatoprotective Effect of *Antrodia cinnamomea* Mycelium in Patients with Nonalcoholic Steatohepatitis: A Randomized, Double-Blind, Placebo-Controlled Trial

Ya-Ling Chiou<sup>a</sup>, Charng-Cherng Chyau<sup>b</sup>, Tsung-Ju Li<sup>c</sup>, Chia-Feng Kuo<sup>d</sup>, Yu-Yling Kang<sup>a</sup>, Chin-Chu Chen<sup>c,d,e</sup>, and Wang-Sheng Ko<sup>a,f</sup>

<sup>a</sup>Department of Nutrition, Master Program of Biomedical Nutrition, Hungkuang University, Taichung City, Taiwan; <sup>b</sup>Research Institute of Biotechnology, Hungkuang University, Taichung City, Taiwan; <sup>c</sup>Biotech Research Institute. Grape King Bio Ltd. Taovuan City, Taiwan; <sup>d</sup>Department of Food Science, Nutrition, and Nutraceutical Biotechnology, Shih Chien University, Taipei City, Taiwan; <sup>c</sup>Institute of Food Science and Technology, National Taiwan University, Taipei City, Taiwan; <sup>c</sup>Department of Internal Medicine, Kuang-Tien General Hospital, Taichung City, Taiwan; <sup>c</sup>City, Tai







### FDA IND Submission: A Phase II Clinical Trial Review





Drug/Biologic Discovery

Pre-Clinical Development

Clinical Development

**GK-Antrodia**©

Phase I

Phase II

Phase III

Post-Marketing





### "GK-Antrodia© Products Launched







**Antrodia King** 

Antrodia Aqua









### "GK-Antrodia© Products Launched



Antrodia Coffee





# Neuro-trition *GK-Hericium©*

- Prevent early Alzheimer's
- Ameliorate Hearing Loss

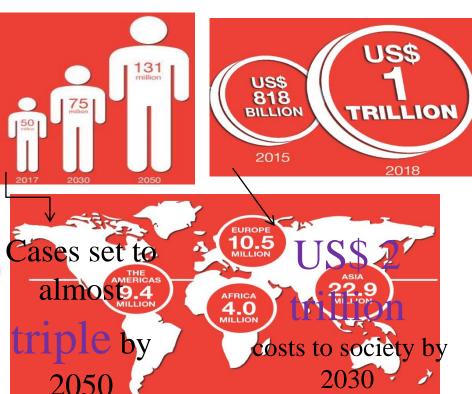




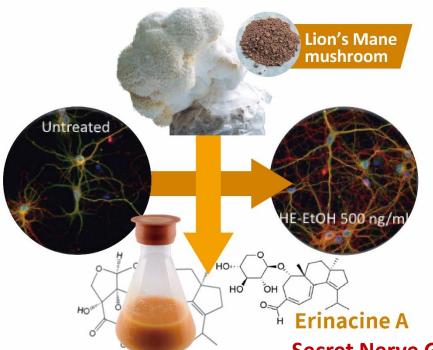


### **Dementia is a Global Issue**









# Erinacine contents in fruiting bodies and mycelial cultures of *Hericium erinaceus*

	Matrix(parts)	
	Sawdust (fruiting body)	0.01mg/g
	Sawdust (mycelia)	N.D.
Solid	Agar(fruiting body)	N.D.
Solid	Agar(mycelia)	N.D.
	Grain (fruiting body)	N.D.
	Grain (mycelia)	N.D.
Submerged	Liquid(mycelia)	33.8mg/g

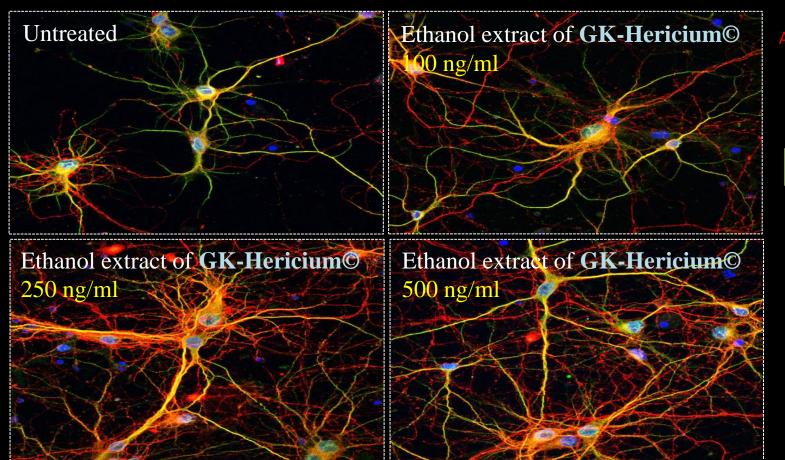
N.D.: Below 1ppm

**Secret Nerve Growth Factors** 





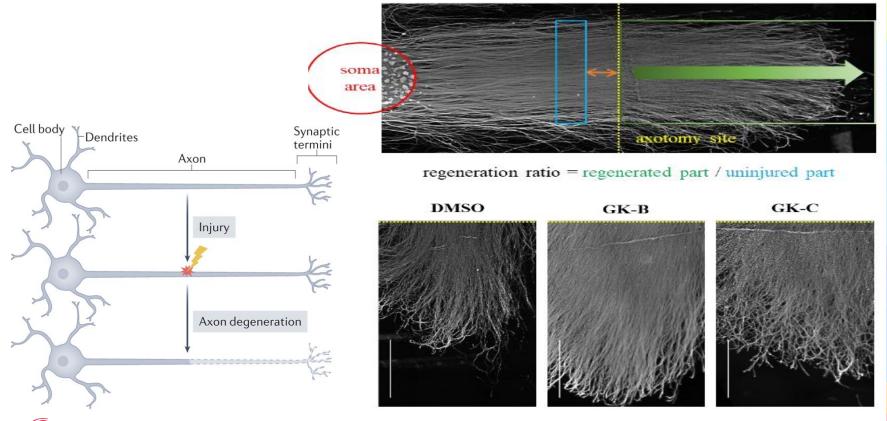
### Primary cortical neurons treated with **GK-Hericium**©



Anti-Tau Anti-MAP2 (Green): dendrite Dendrite

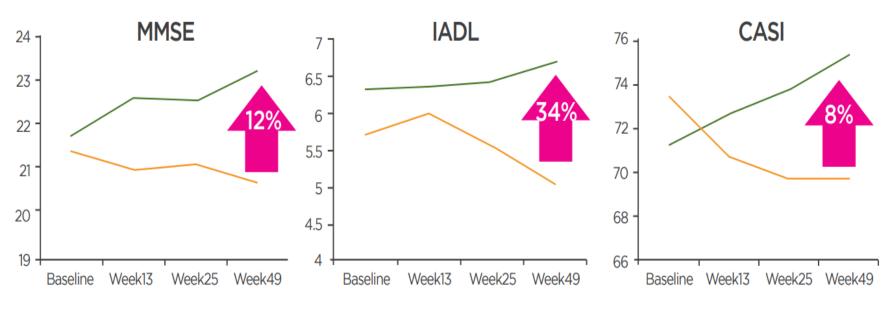
**Axon** 

### **GK-Hericium©** Enhances Axon Regeneration





### **GK-Hericium©** Prevents Early Alzheimer's (n=42)



Hericium erinaceus
Placebo

MMSE: Mini-Mental Status Examination

CASI: Cognitive Abilities Screening Instrument IADL: Instrumental Activities of Daily Living





CLINICAL TRIAL published: 03 June 2020 doi: 10.3389/fnagi.2020.00155



# Prevention of Early Alzheimer's Disease by Erinacine A-Enriched Hericium erinaceus Mycelia Pilot Double-Blind Placebo-Controlled Study

I-Chen Li<sup>1</sup>, Han-Hsin Chang<sup>2</sup>, Chuan-Han Lin<sup>3</sup>, Wan-Ping Chen<sup>1</sup>, Tsung-Han Lu<sup>3</sup>, Li-Ya Lee<sup>1</sup>, Yu-Wen Chen<sup>1</sup>, Yen-Po Chen<sup>1</sup>, Chin-Chu Chen<sup>1,4,5,6\*</sup> and David Pei-Cheng Lin<sup>3,7\*</sup>

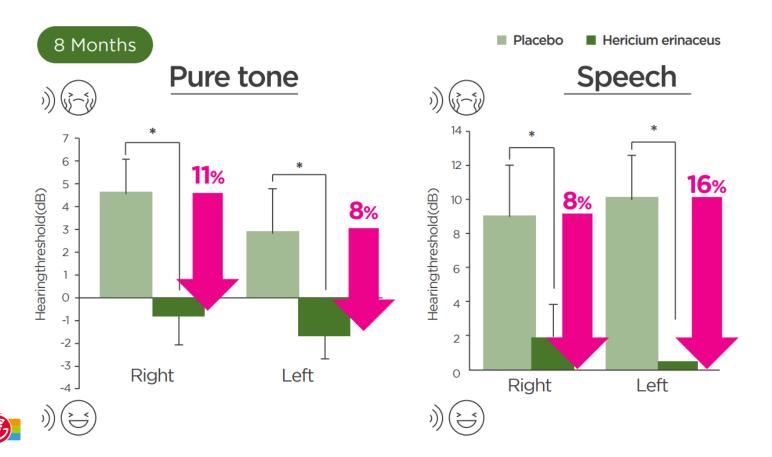
Grape King Biotechnology Ltd.



<sup>1</sup> Biotech Research Institute, Grape King Bio Ltd., Taoyuan City, Taiwan, <sup>2</sup> Department of Nutrition, Chung Shan Medical University, Taichung City, Taiwan, <sup>3</sup> Department of Medical Laboratory and Biotechnology, Chung Shan Medical University, Taichung City, Taiwan, <sup>4</sup> Institute of Food Science and Technology, National Taiwan University, Taipei City, Taiwan, <sup>5</sup> Department of Food Science, Nutrition and Nutraceutical Biotechnology, Shih Chien University, Taipei City, Taiwan, <sup>6</sup> Department of Bioscience Technology, Chung Yuan Christian University, Taoyuan City, Taiwan, <sup>7</sup> Department of Ophthalmology, Chung Shan Medical University Hospital, Taichung City, Taiwan



#### **GK-Hericium©** Ameliorates Hearing Loss (n=24)



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#### Journal of Functional Foods

journal homepage: www.elsevier.com/locate/jff



Effects of erinacine A-enriched *Hericium erinaceus* on elderly hearing-impaired patients: A double-blind, randomized, placebo-controlled clinical trial\*

Yin-Ching Chan <sup>a</sup>, Tzu-Chun Lin <sup>b</sup>, Chin-Chu Chen <sup>b,c,d</sup>, Li-Ya Lee <sup>b</sup>, Wan-Ping Chen <sup>b</sup>, Ya-Zue Liu <sup>a</sup>, Juen-Haur Hwang <sup>e,f,g,\*</sup>

Grape King Biotechnology Ltd.





<sup>&</sup>lt;sup>a</sup> Department of Food and Nutrition, Providence University, Taichung, Taiwan

b Biotech Research Institute, Grape King Bio Ltd., Taoyuan, Taiwan

<sup>&</sup>lt;sup>c</sup> Department of Food Science, Nutrition, and Nutraceutical Biotechnology, Shih Chien University, Taipei, Taiwan

<sup>&</sup>lt;sup>d</sup> Institute of Food Science and Technology, National Taiwan University, Taipei, Taiwan

e Department of Otolaryngology-Head and Neck Surgery, Dalin Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Chiayi, Taiwan

f School of Medicine, Tzu Chi University, Hualien, Taiwan

g Department of Medical Research, China Medical University Hospital, China Medical University, Taichung, Taiwan

#### " GK-Hericium© Products Launched

Hericium King





Nootropics's ErinaMAX

GKB Lion's Mane





Pro-partner's Neuro-trition





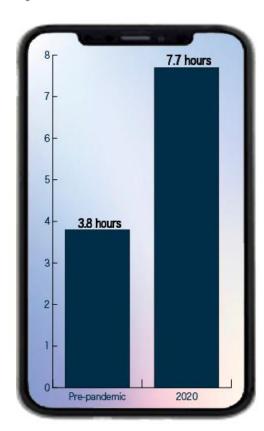


- Improve Dry Eye Syndrome
- Lower High Eye Pressure

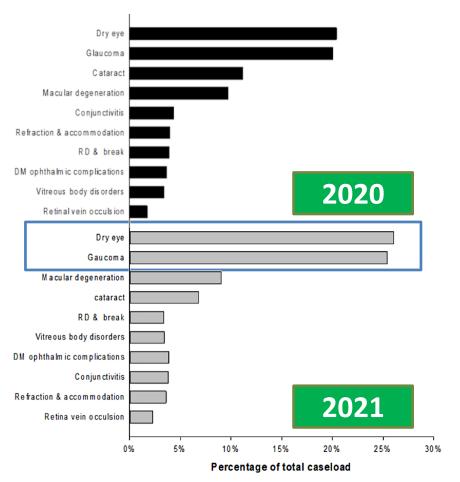




#### Adolescents spent a mean time of over seven hours a day on screen in 2020.



#### Top common diagnoses of ophthalmic patients in Taiwan

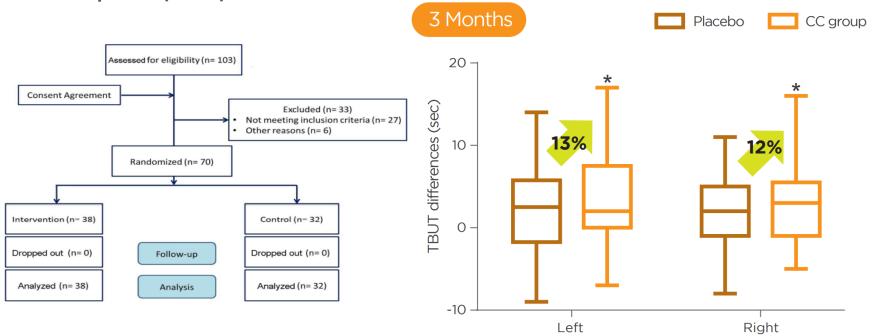




Data from Jama Pediatrics

#### **GK-Cordyceps©** Helps Dry Eye Syndrome (n=97)

After administration of CC for 3 months, there was a significant improvement in tear break-up time (TBUT).





# Efficacy of Cordyceps cicadae (Ascomycota) Mycelium Supplementation for Amelioration of Dry Eye Symptoms: A Randomized, Double-Blind Clinical Pilot Study

Han-Hsin Chang, a,b Wen-Jui Chang, Bo-Yi Jhou, Szu-Yu Kuo, Jui-Hsia Hsu, Yen-Lien Chen, Chin-Chu Chen, Berja, & David Pei-Cheng Linb, David Pei-Cheng Linb, David Pei-Cheng Linb, Pei-Cheng Li

#### Grape King Biotechnology Ltd.

Chung Shan Medical University, Taichung City 402, Taiwan; Department of Ophthalmology, Iversity Hospital, Taichung City 402, Taiwan; Department of Ophthalmology, Landseed oyuan City 320, Taiwan; Crape King Bio Ltd., Taoyuan City 320, Taiwan; Department of and Nutraceutical Biotechnology, Shih Chien University, Taipei City 104, Taiwan; Institute hnology, National Taiwan University, Taipei City 106, Taiwan; Department of Bioscience

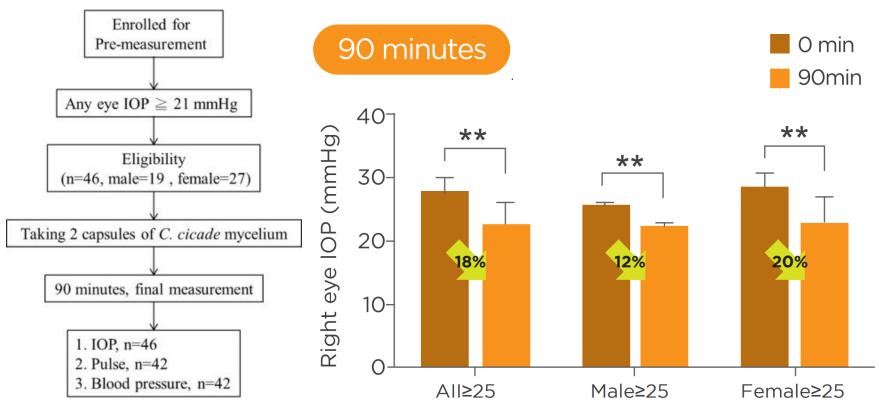
Technology, Chung Yuan Christian University, Taoyuan City 320, Taiwan; Department of Medical Laboratory and Biotechnology, Chung Shan Medical University, Taichung City 402, Taiwan

\*Address all correspondence to: Chin-Chu Chen, Institute of Food Science and Technology, National Taiwan University, No. 1, Sec. 4, Roosevelt Rd., Taipei 106, Taiwan; Tel.: +886-(03)-499-3093; Fax: +886-(03)-499-3713, E-mail: gkbioeng@grapeking.com.tw; or David Pei-Cheng Lin, Department of Medical Laboratory and Biotechnology, Chung Shan Medical University, No. 110, Sec. 1, Chien-Guo North Road, Taichung 402, Taiwan; Tel.: +886-(04)-2473-0022; Fax: +886-(03)-499-3713, E-mail: pcl@csmu.edu.tw





#### **GK-Cordyceps©** Lowers High Eye Pressure





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journal homepage: www.elsevier.com/locate/jff



Clinical evaluation of the short-term effects of *Cordyceps cicadae* mycelium in lowering intraocular pressure

Jui-Hsia Hsu<sup>a</sup>, Wen-Jui Chang<sup>b</sup>, Hsin-I Fu<sup>a</sup>, Han-Hsin Chang<sup>c,\*</sup>, Chin-Chu Chen<sup>a,d,e,f,\*</sup>

Grape King
Biotechnology Ltd.





<sup>&</sup>lt;sup>a</sup> Biotech Research Institute, Grape King Bio Ltd, Taoyuan City, Taiwan

<sup>&</sup>lt;sup>b</sup> Department of Ophthalmology, Landseed International Hospital, Taoyuan City, Taiwan

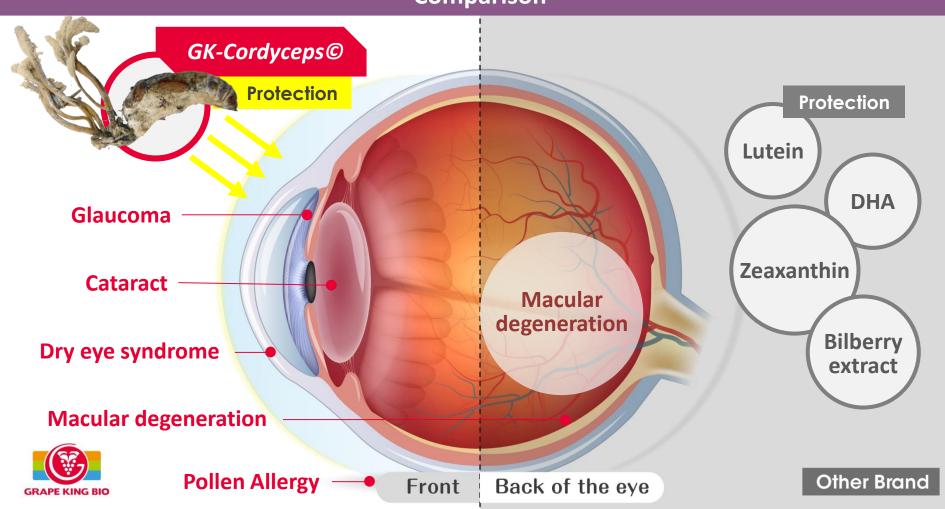
<sup>&</sup>lt;sup>c</sup> Department of Nutrition, Chung Shan Medical University, Taichung City, Taiwan

d Institute of Food Science and Technology, National Taiwan University, Taipei City, Taiwan

e Department of Food Science, Nutrition and Nutraceutical Biotechnology, Shih Chien University,

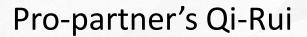
f Department of Bioscience Technology, Chung Yuan Christian University, Taoyuan City, Taiwan

#### Comparison



#### GK-Cordyceps© Products Launched







Cordi C



**GKB** Cordyceps





# Multi Functional **GK-Probiotics**

 Each probiotic strain offers specific benefits





#### **Multiple Functionalities of Grape King's Probiotics**



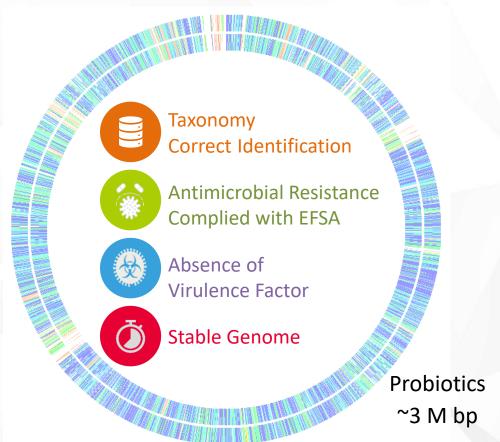
Asia's largest resource bank > 1000 strains



Optimized strain development which exert specific health benefits

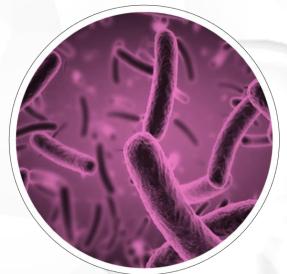


Highest viable cells on the market 1 to 8 x 10<sup>11</sup> cfu/g

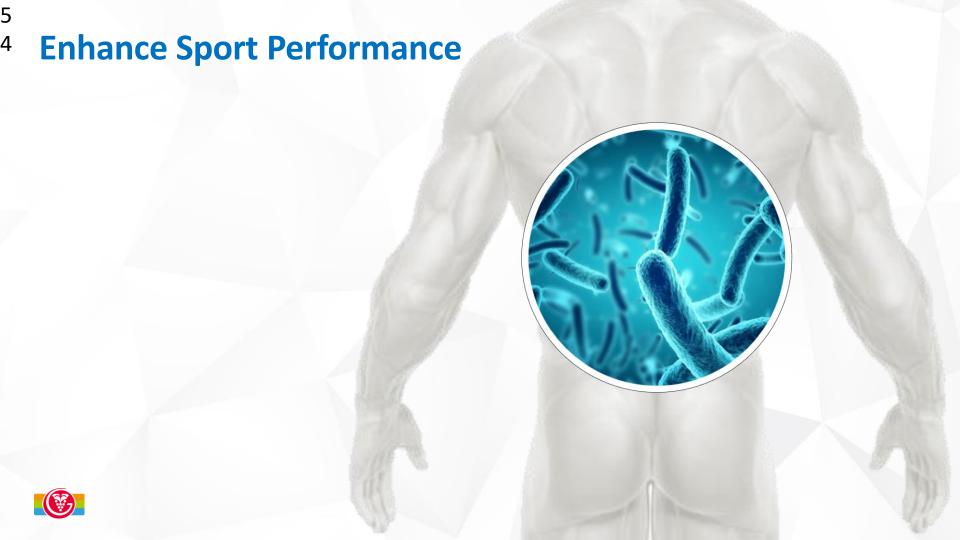




**Smoking Cessation** 

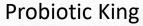






#### Probiotic Products Launched





(GKM3, GKK2, GKS6, GKG6, GKA7, GKC1, GKF3)



Light Probiotic King (GKM3)



GoodNight Probiotic King (GKF3)



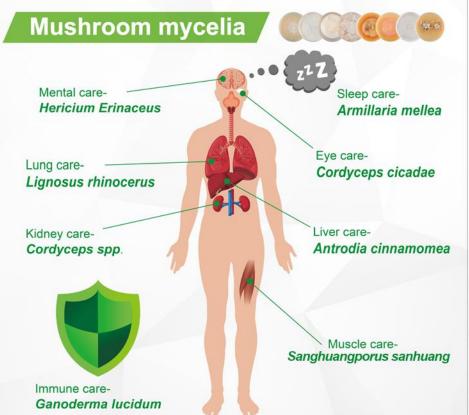


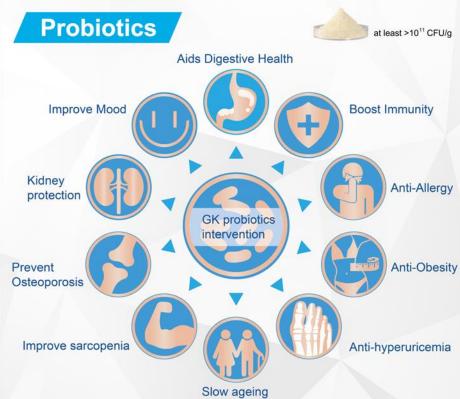


#### **Grape King's functional raw materials**









#### **Next Generation Food**

Reduced freshwater and arable land usage as well as carbon footprint



Sea Water Cultured GK Mycoprotein

—An Alternative Sustainable Protein Source



**GRAS**Fusarium venenatum



Utilizing freshwater as well as seawater for production



Flavored/Colored final product: Whole cuts of variable thickness



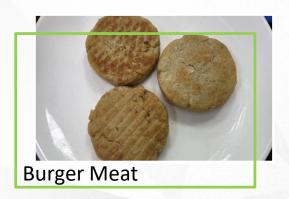




### **FungGi meet Finished Products**

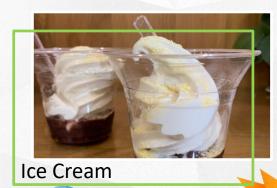














#### **GK INCI List**

- Bifidobacterium Ferment Extract
- Lactobacillus Ferment Extract
- Polyporus Umbellatus Ferment Extract
- Antrodia cinnamomea Extract
- Lepista Nuda Ferment Filtrate Powder
- Lepista Nuda Ferment Extract
- Cordyceps Cicadae Mycelium Extract



#### **Next Generation Cosmeceuticals**

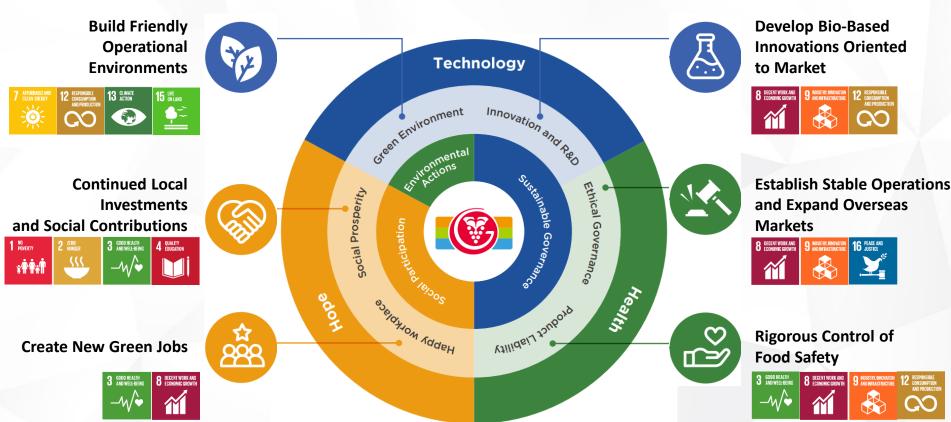




#### Sustainability Strategy: Grape King Bio as an example



#### Bioeconomy in Grape King BIO: For a Better World





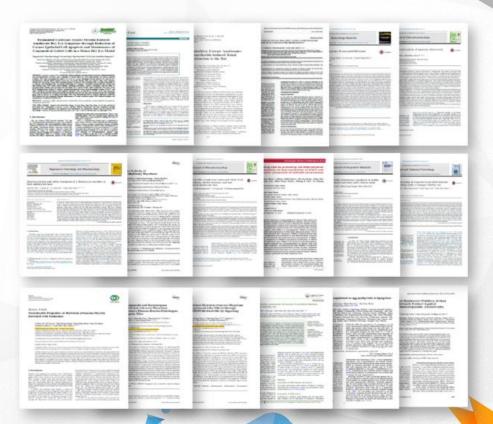
2019: RE 100

### Papers published

128 SCI papers published

254 Total papers published

Year	SCI	Total
2019	8	20
2020	12	26
2021	16	26
2022	17	37







**Acknowledge to Strong Research Team** 

#### Academic Institutes

- National Yang-Ming University
- National Taiwan University
- Taipei Medical University
- Hung Kuang University
- China Medical University
- National Chung Hsing University
- Chung Shan Medical University
- National Cheng Kung University
- Kaohsiung Medical University
- And many more...

Industry-Academia **Cooperative Projects** 

with 111 Academic Institutes and Medical Centers

Hospitals or

LU Teaching **Medical Centers** 

#### Medical Centers

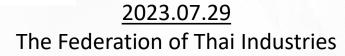
- Taipei Veterans General Hospital
- Taipei City Hospital
- Chang Gung Memorial Hospital
- Cheng Hsin General Hospital
- Landseed International Hospital
- Chung Shan Hospital
- Kuang Tien General Hospital
- Tzu Chi General Hospital
- National Cheng Kung University Hospital
- Kaohsiung Medical University Chung-Ho Memorial Hospital

Year	Commissioned projects	
2020	32	
2021	28	
2022	30	





2023.07.28 Thailand Biotech Industry Club









#### Live Healthy | Think Grape King

## THANK YOU







Mushroom mycelia

Probiotics

Microbiological products and internship

Grape King Biotech Research Institute welcomes
OEM & ODM orders











